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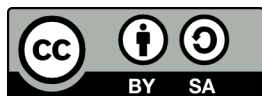
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# DELIVERABLE REPORT

## D7.1.2

### “Incidental Learning Framework”

collaborative project  
**MASELTOV**  
 Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning  
 Technologies and Social Network Services  
 Grant Agreement No. 288587 / ICT for Inclusion  
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<b>Task</b>	<b>Task 7.1 – Incidental Learning Framework</b>
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## CONTENT

1. Executive summary .....	6
2. Introduction .....	7
3. Purpose of the framework .....	7
4. Learning terminology.....	8
5. Review of the Incidental Learning Framework.....	9
5.1 Reviewing the initial Incidental Learning Framework .....	9
5.3 Challenges raised by the incidental learning framework initial design process.....	12
6. Ongoing work with the incidental learning framework .....	14
6.1 Additional literature review .....	15
6.2 Technical challenges in supporting incidental learning.....	19
7. Focus groups and expert feedback .....	20
7.1 Plenary workshop session, Athens, September 2012 .....	20
7.2 Pedagogical design experts focus group.....	21
7.3 Extended “Day in the life of” scenario.....	22
7.4 Open University educational technology seminar .....	24
7.5 Interviews with learning design experts.....	25
8. Partner testing .....	27
8.1 Template for testing.....	27
8.2 Summary of partner testing.....	28
9. Language learning and incidental learning .....	28
10. Serious games and incidental learning.....	30
10.1 Update on research findings .....	30
11. Conclusions and recommendations .....	36
12. References.....	36
Appendix A: “A day in the life of...” scenario .....	41
Appendix B: Responses from partners on their service use.....	43

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## 1. EXECUTIVE SUMMARY

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This document describes progress in the development of an ‘Incidental Learning Framework’, building on the work reported in Deliverable D7.1.1, submitted July 2012.

The goal of the Incidental Learning Framework (ILF) is to facilitate the creation of technology rich learning opportunities for immigrants within cities. The framework is a descriptive mechanism that permits analysis, and a generative tool to support software system design, and it facilitates the communication of learning design ideas both visually and textually. The framework focuses on incidental learning i.e. learning that is spontaneous and unplanned, in the knowledge domains of interest to the MASELTOV project including health care, culture, and language and information access. Its use should encourage links and triggers to structured and reflective learning to back up and deepen learning that happens incidentally.

This document describes the Incidental Learning Framework developed for the MASELTOV project, presents a examples of its use, and describes some conclusions and recommendations for future work

- Introduction
- Purpose of the framework
- Challenges with ILF from its initial conception
- Work carried out developing ILF for use in the project
  - Literature
  - Alternative visualisations
  - Focus workshops in OU
- Partner testing
  - Template for testing
  - Examples of the partners’ testing their tools against the template
- Reporting on incidental learning reflections with language learning and serious games
- Conclusions and recommendations

It should be noted that this document is a high level review, identifying significant literature and the on-going development of the framework through dialogue with educational experts and MASELTOV partners. This document offers recommendations therefore in general terms. Decisions about the specific implementation of the learner’s journey as framed by an incidental learning approach will be made in coordination with technical partners as the dialogue progresses.

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## 2. INTRODUCTION

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This deliverable describes the progress made with the Incidental Learning Framework for the MASELTOV project. In Section 3 we describe the purpose of the framework, and in Section 4 we present some background information on learning terminology to help the reader understand the framework and the situation in which it will be used. Section 5 provides a brief review of previous work, to set the current work into context, and identifies challenges raised in the first document. Section 6 describes ongoing research into incidental learning and the technical challenges, while Section 7 reports on focus groups and other expert feedback that has informed the continuing development of the ILF. In Section 8 we discuss an exercise to gather feedback from MASELTOV partners, and in Sections 9 and 10 we focus on how the incidental learning work has informed partners' thinking on language learning and serious game. Finally, in Section 11 we round up with some conclusions on the work done so far and our recommendations.

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## 3. PURPOSE OF THE FRAMEWORK

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The incidental learning framework is intended to facilitate the coordination of technologies, content, pedagogies, processes and practices into learning services that can be used effectively by immigrants, their networks and mentors so as to meet the objectives of WP7. It also helps to provide guidelines for development of new technologies, content, pedagogies, processes and practices.

The framework is intended to help users of the framework produce adaptive services that take account of individual learner's characteristics and contexts. The framework is intended to be used by the partners implementing software and content within the MASELTOV project and provide a model that can be employed by other researchers developing incidental learning services.

The aims of WP7 are

- “To increase immigrants’ ability to function in an unfamiliar society by facilitating communication and learning, and by structuring technological supports according to user needs.
- To change in a positive way immigrants’ attitudes and behaviours through technology-mediated persuasion and social networking influence.
- To take advantage of situation and context to capture user motivation and extend immediate assistance into more structured learning, game-playing, and interaction with other immigrants and the wider community”.

The incidental learning framework is focussed on supporting MASELTOV consortium partners in designing learning services. Learning frameworks can be broadly divided into design frameworks (supporting the design of services) and analytical frameworks (whose main purpose is to provide a mechanism for analysing, understanding and evaluating existing learning events).



Given the goals of Task 7.1 described in the Description of Work, the focus is on design frameworks and tools: supporting the planning and instantiation of new learning events and situations. It should be remembered though that most design frameworks include an iterative design cycle, which includes cyclical stages of analysis and evaluation to inform subsequent stages of design and implementation. The MASELTOV project employs an iterative, user centred and participatory design model, so while the incidental learning framework is intended to be design focused, it also includes analytical elements to support on-going development based on prior reflections.

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#### 4. LEARNING TERMINOLOGY

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In this section we summarise key terminology for characterising learning that will be used in the remainder of this deliverable. It aims to help the reader understand the deliverable, and aspects of the context in which the incidental learning framework will have to operate.

The notion of *incidental learning* highlights opportunistic elements of learning when compared with the learning opportunities that occur in *formal* and *structured* programmes, and can be seen as distinct from *informal learning*.

*Formal learning* occurs on standardised learning pathways, through pre-established bodies of knowledge, and the pathways are defined by experts in the knowledge domain (Livingstone, 2001). Formal learning is often highly structured, delivered through a planned curriculum, led by a (usually qualified) teacher, and often awards some form of accreditation. *Informal learning* often occurs in the workplace, is less standardised, perhaps even unique to each learner, and emphasises learning through social interactions and networks (Victoria J Marsick, 2009). Control of the learning is in the hands of the learner ((V. J. Marsick & Watkins, 1997), referenced in (Cofer, 2000)). However, informal learning still implies learner intent, and the planning of future activities ((Ellinger, 1997), referenced in (Victoria J. Marsick, Watkins, Callahan, & Volpe, 2009)).

*Incidental learning* occurs as the by-product of some other activity; it is unplanned and unintentional (Kerka, 2000; Silva, 2007). As a result, some elements of learning are more spontaneous than other modes of learning: goal planning, reflection on improving performance for specific activities, and structured feedback from peers. So, for example a goal will arise out of an encounter in which communication difficulties occur and the learner realises that she/he needs to do some more learning in order to improve ('learning outcomes' in the ILF). Incidental learning happens during everyday activities. It is therefore particularly suited to a *mobile learning* approach: learning occurring on the move, or being able to access resources in different places (Brown, 2010). MASELTOV particularly focuses on a target audience accessing resources via smart phones, and Klopfer et al. (2002)'s recognition of five salient features of mobile devices in the context of learning (portability, context sensitivity, connectivity, individuality, and social interactivity) make these particularly relevant for a learning approach that occurs during every day activities while out and about, at home and at work. Embedded in everyday practices and present in daily routines, mobile phones lend themselves to learning through social interaction.

This combination of pervasive, social and mobile resources provides the opportunity for *peer-to-peer learning* and teaching, where those that are more advanced may take on a peer teaching role, and the others in the group take on a learning role, and also reciprocal models of learning where those in a group act as both teachers and learners (Boud et al. 1999). Within MASELTOV, we are explicitly drawing on this model of learning, with knowledge sharing through the social forum, language learning structured to enable peer feedback, and the Geo-Social Radar offering social support from local volunteers (See MASELTOV Deliverable D6.1.1 “Mobile Assistant”, p.9 for overview). Motivating potential audiences to engage and re-engage with the MASELTOV services is critical, and we draw on gamification, the use of playful learning elements derived from video game environments to improve user experience and engagement (Deterding, Dixon, Khaled, & Nacke, 2011). As the MASELTOV service’s overarching goal is to enable the successful social inclusion of its target audience, success into their new host country, and as such perhaps provide a great deal of initial support but aim that gradually the service be less required, we consider scaffolding as an important concept: supporting the learner with other people, tools or resources, so that the learner is able to attain outcomes that they would not have been able to do without the scaffolding, but aiming to gradually reduce this support (or offer alternative support for different needs) as the learner becomes more competent (Luckin, 2010). Such guidance is often provided through feedback, responses to a learner’s performance in tasks against criteria of quality with the aim of directing and encouraging their future learning (M. Gaved et al., 2013). Feedback, and progress indicators (responses indicating the current position of a learner within a larger activity or journey) are described in more detail in the associated Deliverable D7.2 (“Feedback and Progress Indicators”).

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## 5. REVIEW OF THE INCIDENTAL LEARNING FRAMEWORK

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In this section we reflect on the Incidental Learning Framework as first developed in Deliverable D7.1.1, highlight the challenges which were identified, and our on-going responses.

### 5.1 REVIEWING THE INITIAL INCIDENTAL LEARNING FRAMEWORK

The goal of the first learning framework document (D7.1.1) was to develop an initial model to test with the target users – learning and software designers – to enable a bridge between an initial conceptualisation of an instance of incidental learning, and a detailed specification of the data and technology interactions needed for a technological system to offer support to a learner during the situation encountered. The framework acts as a “boundary object” (Star, 1988) providing a representation of a learning event or journey that can be understood by experts from different domains. The intention was to develop a first model that could then be presented to consortium partners, tested, and reflected upon. Modelling a specific occurrence of an instance of incidental learning required a framework that could capture and reflect upon a number of dimensions, such as the learner’s place, time, desired outcomes, and the interrelationships between these dimensions.

We focussed on capturing individual events, or incidents (a term that has proved ambiguous: see Challenge 7 ahead for discussion), however, we recognised that learning is an on-going

process, and aimed to encourage the users (learning and software designers) to consider reflection, iterations of tasks, achievement of learning outcomes, and further planning as well as identifying how to support the immediate resolution of individual events.

The presentation of the framework can be thought of as a basis for modelling one iteration of a learning pattern: core solutions to learning problems that reoccur in a context: “Patterns are not viewed as something that can be reused directly but rather as something that can provide the informed teacher with ‘rules of thumb’ as they build up their own range of tasks, tools or materials that draw on a collected body of experience (McAndrew, Goodyear, & Dalziel, 2006, p. 218). Our intention is that a learning pattern should be able to be applied in a slightly modified form to produce iterations of learning to enable the learner to reach other higher outcomes, hence the decision to present the framework as circle, with time as the driving dimension.

The incidental learning framework drew from a number of sources. Luckin’s Ecology of Resources model (Luckin, 2010) considers the concept of a “More Able Partner” that can enable a learner to progress their learning beyond what they themselves are capable of achieving, which derives from Vygotsky’s concept of the Zone of Proximal Development, the distance between what a learner can do without help and what he or she can do with help from a more able assistant (Vygotsky, 1978)). Within MASELTOV, the More Able Partner might take the form of software, a peer learner, a volunteer in the community or an information resource, so this concept is well placed to be enacted within the range of tools being developed across the project. Luckin also considers how user support should gradually “fade” as the user becomes more competent in their accomplishments: “there is a growing body of evidence that fading is a fundamental and intrinsic component of scaffolding” (Luckin, 2010, p. 48) which matches well with the ultimate goal of the MASELTOV services to encourage social inclusion by the user in their new host country. Furthermore, Luckin’s model emphasises an iterative process of development, similar to the MASELTOV design process. As MASELTOV services are intended to be provided primarily on smart phones, the incidental learning framework also drew on models of mobile learning:

Sharples et al. define mobile learning as ‘the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies’ and put forward a theory of learning for a mobile society (Sharples, Taylor, & Vavoula, 2007). Their framework for analysing mobile learning builds on the notion of conversation as an essential component in the process of learning (Laurillard, 2002), which supports MASELTOV’s emphasis on social learning and inclusion. Language learning is another key aspect of the MASELTOV services, and we drew on Kukulska-Hulme’s framework for mobile supported language learning in informal settings (Agnes Kukulska-Hulme, 2012). This framework consists of three dimensions (activity, time and place), and prompts reflection by designers on how each dimension might impact learning. Finally, we drew on de Freitas and Oliver’s four dimensional framework for games and simulation based education (de Freitas & Oliver, 2006), intended to be used by tutors who wish to make use of games or simulations in their teaching. It is to be used iteratively to evaluate and select games or simulations prior to their use, and is intended to provide heuristics, which allow practitioners “to be more critical about how they embed games and simulations in their lesson plans”. The framework asks practitioners to consider four dimensions: the context in which learning takes place, the nature of the learner, the representation of the learning (in the game), and the process of learning (considering theoretical approaches that might apply). The introduction of the notion of ‘Representation’ as the internal representation world of the game, and the relationship of this

to the learners' behaviour outside of the game is an important one that we felt should be included within the incidental learning framework, not only with respect to the serious game element (see future deliverables D7.4.1 and D7.4.2 for description of the game), but as a relevant concept across all tools and services that the framework would apply to.

Models of learners are used frequently in e-learning systems to describe the state of the learner so that the system can react appropriately. In MASELTOV, we describe the learning approach to understanding the learner's situation through Deliverable 7.2 "Feedback and Progress Indicators", and its practical implementation is described in WP5 "User Profile and Recommendation"

Drawing from this work, we identified the following dimensions as significant, and to be described within the incidental learning framework:

- the **place** the incident (and structured learning, planning or reflection) occurs; place is not just a location, but also specifies some contextual information;
- the **task(s)** the learner is attempting to carry out;
- the **tools** (including content) the learner can or does use to complete the task;
- the **social support** that the learner can or does make use of; the combination of tools and people is conceptualised as a 'More Able Partner';
- the **learning outcomes** that the learner wants to achieve, and those that she/he does achieve;
- the (relative) **time** the incidents (or structured learning, planning or reflection) occur. As learning occurs over time, and previous learning outcomes affect the learner's readiness for subsequent tasks, the framework must represent the relative time when learning occurs. Time is not just a specification of an instant or a measurement of a duration, but may also include contextual information e.g. 'lunch time'.

As noted, the decision was made to depict the framework as a circle, driven by time, with the implication of an iterative process occurring as part of learning. Figure 1 portrays the Incidental Learning Framework, as presented in Deliverable D7.1.1. "Slices" are cut into the circle, which represent specific events, or incidents occurring, that are to be examined against the dimensions of the framework.

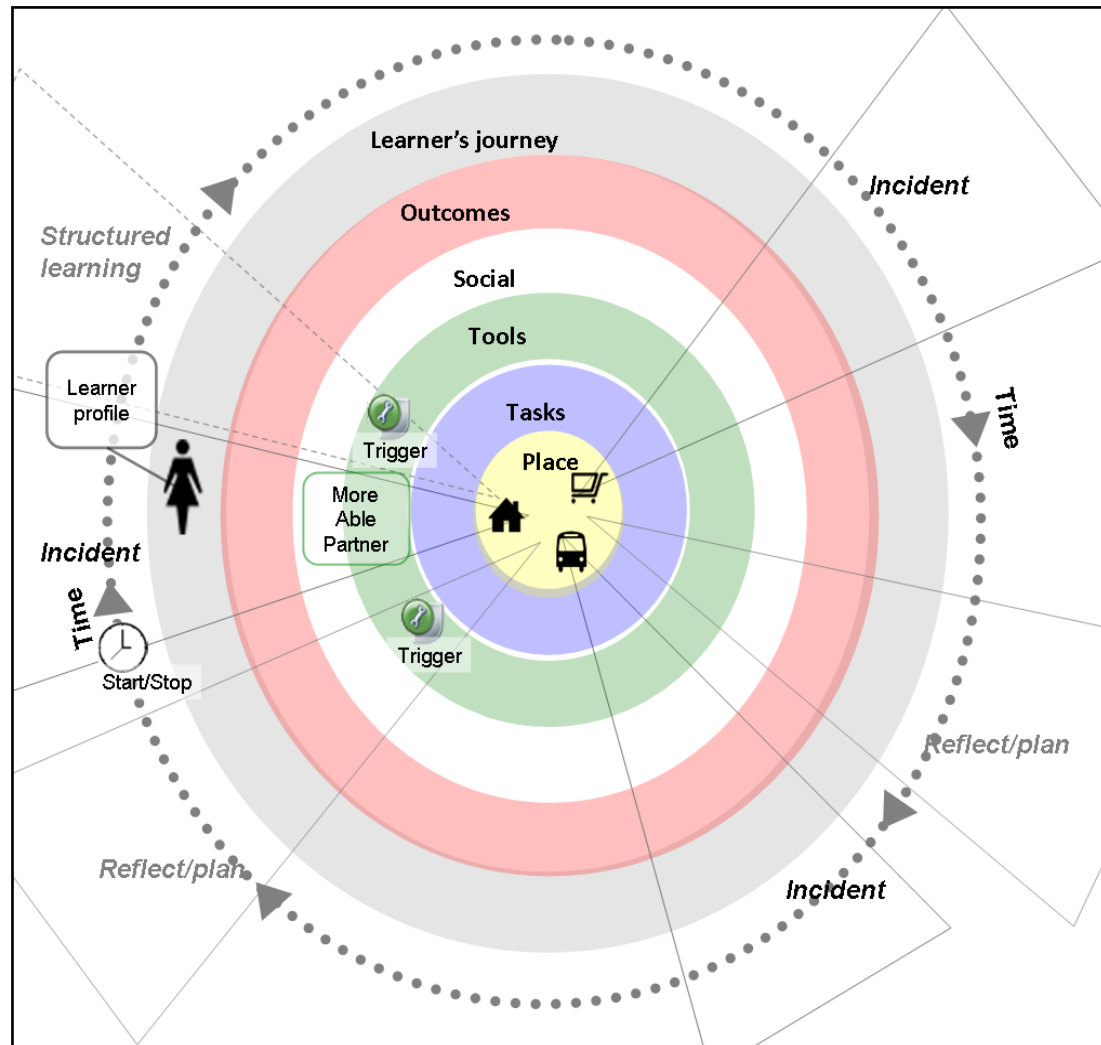


Figure 1 A schematic of the incidental learning framework

### 5.3 CHALLENGES RAISED BY THE INCIDENTAL LEARNING FRAMEWORK INITIAL DESIGN PROCESS

During the initial design process, we identified a number of challenges that should be addressed in future consideration of the incidental learning framework. These were documented within the previous Deliverable (D7.1.1), and in this document we offer responses and updates to our thinking.

#### Challenge 1: Use the framework to develop it further

*“We need to determine if the framework is at the right level of abstraction”*

In Section 8 we describe how we have used the initial Incidental Learning Framework with partners to test its validity and functionality. This is further reported in under Challenge 4, following.

## **Challenge 2: Extend the literature review**

In Section 6, we describe our continued research into incidental learning, including technology related language learning. Furthermore, in Section 9 below, we describe the progression in our partner busuu's consideration of how incidental learning might affect language learning.

## **Challenge 3: Gather evidence about target immigrants' day-to-day lives**

In D7.1.1, we noted that the incidental framework would be better informed by gathering further evidence about target immigrants' day-to-day lives. This is handled in WP2 and has also been addressed through feedback gathered during WP9 user evaluation and field trials.

This has allowed us to consolidate the incidental learning framework by considering a revised user scenario "A day in the life of ...", which was generated by the consortium and presented in the First Year Review in Luxembourg, March 2013. This is described in Section 7.3, following.

Future MASELTOV activities (carried out after this report) will also support the iterative development of MASELTOV services, and reflection on the incidental learning framework. While formal reporting of the incidental learning framework is completed with this document, the user centred and participatory development approach of MASELTOV services means the goal of this document is to inform partners as the software tools and services are iteratively developed.

## **Challenge 4: Run design workshop(s) using the framework**

In D7.1.1 we identified that the Incidental Learning Framework would be strengthened by MASELTOV partners, and other experts testing and reflecting on the current model. As a result, the following actions have taken place:

- All-partner workshop session (Athens, September 2012, at Plenary) – reported in Section 7.1 below
- Consortium wide generation of extended user scenario, "A day in the life of..."
- Learning experts' focus group and interviews held at OU, Spring 2013 – reported in Section 7.2 below.
- Feedback from academic presentations of incidental learning framework – reported in Section 7.4 below.
- Individual partner feedback: software developers asked to test their software against the model using a template structure: reported in Section 8 below.

The inclusion of NGO representatives instead of immigrants themselves has mean that the workshops were be a form of participatory design-by-proxy, however as the framework is intended to be used by designers, rather than the intended target audience.

## **Challenge 5: Specification of context**

*"We need to consider if or how macro context factors such as social economic and political factors should be handled."*



Discussions with the MASELTOV NGO partners (MRC, FUN, DAN) have confirmed that macro factors (such as national social or economic conditions) can impact local learning environments for the MASELTOV target audience. However, these are borne in mind by partners when testing software against the incidental learning framework, it is understood that both macros as well as micro contextual circumstances need to be considered when designing appropriate software tools and services. Therefore we conclude, after partner feedback (See Section 8, partner trials) that the incidental learning framework is flexible enough to consider both micro and macro contextual circumstances, and enables software developers to design accordingly.

### **Challenge 6: Implications of the incidental learning framework for WP9 “Field trials and evaluation”**

*“Our framework can represent learning that takes place over periods of hours, days, weeks or longer. Methods for evaluating user experience and learning over long periods need to be used, e.g. diary studies.”*

We consider the incidental learning framework to be capable of supporting both short term and long term learning experiences. Within the MASELTOV project, we are bounded by the previously agreed Description of Work, and WP7 does not include evaluation work. However, we have made recommendations to WP9 (Field Trials and Evaluation) for our suggestions on appropriate evaluation tools and will be working with this team as far as we can to incorporate longitudinal evaluation approaches into the field trials process.

### **Challenge 7: Ambiguity of ‘incident’ and ‘incidental’ terms**

Through development of the framework and its subsequent testing, we realised the potential for confusion between the term “incidental learning”, to refer to unplanned, unintentional learning, and the terminology to describe specific occasions where this may happen – sometimes identified as “incidents”. In the English language, “incident” implies an element of crisis, and we identified that this was focussing thinking around the resolution of crises, which strays close to the field of “Incident Learning”, a work place learning theory which seeks to identify how organisations can learn from accidents and breakdowns in operation (Cope & Watts, 2000). Our work on incidental learning, with the framework as a central visualisation and discussion object, aims to also construct and support debate around moments of learning which occur unexpectedly in more reflective and less challenging moments in everyday life, such as when relaxing at the end of a day. With this in mind, we have been working to emphasise not only ‘incidents’ and critical events, but more extended periods of problem realisation, and we are carefully considering what terminology may lead to a broader reflection by learning designers and software developers when using the incidental learning framework. This challenge was also identified in the Athens workshop (see Section 7.1 ahead).

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## **6. ONGOING WORK WITH THE INCIDENTAL LEARNING FRAMEWORK**

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This section describes the work we have carried out from August 2012 with the incidental learning framework.

## 6.1 ADDITIONAL LITERATURE REVIEW

Within D7.1.1 we recognised the need for further literature research in the domains surrounding the incidental learning framework. What follows combines our research on the current frameworks in use in this area and discusses some literature recommended by other educational technology experts who have reviewed the framework. A number of areas have been identified:

- Dialogic and delayed resolution
- Connectivism
- Situated/ contextual learning
- Mobile assisted language learning
- Informal language learning
- Media ecologies

The value of a social dimension in the incidental learning model has been confirmed by further investigation. We approached this from Luckin's work (2010), building on the Vygotskian ideal of the 'More Able Partner', the approach of solving "in collaboration with more able peers" (Vygotsky, 1978, p. 86). Howe (2010) identifies that this has been affirmed by later research into cooperative learning (Johnson & Johnson, 2000) and peer tutoring (Goodlad & Hirst, 1989). Howe indicates (referring to child learners, though we consider this still can be considered of value) the importance of "dialogic resolution" – "the value of interactions where children express contrasting opinions in the pursuit of joint goals" (Howe, 2010, p. 32). By bringing learners together, even with opposing viewpoints, problems can be debated and sense making occurs. Furthermore, it is important that the social interactions can be developed and reflected over time, as learners "...seldom achieve resolution during the relevant dialogue itself. Rather resolution takes places subsequently, sometimes many weeks after the dialogue's completion" (Howe, 2010, pp. 32-33). This is a strong argument for the incidental learning framework to consider both time, and social dimensions. It also emphasises the importance of considering "place" to have both physical and virtual aspects; within MASELTOV, the social forum tools can be identified as offering a valuable "place" that exists over time to enable the generation of shared sense making through sharing and exchanging ideas ("transactive dialogue" (Berkowitz & Gibbs, 1983)) and resolving uncertainties through this process (dialogic resolutions), perhaps supported by 'more able partners' such as experienced members of the community or local volunteers.

This is echoed in the emerging educational research approach of connectivism. According to connectivism, knowledge is generated and distributed across an information network and can consist of a range of digital formats (Kop & Hill, 2008). Similar to Howe's concept of dialogic resolution, connectivism suggests that learning and knowledge "... rest in diversity of opinions" (Siemens, 2008), with "learning [occurring] when knowledge is actuated through the process of a learner connecting to and feeding information into a learning community" (Kop & Hill, 2008). Learning occurs through both cognitive and the affective domains; "cognition and the emotions both contribute to the learning process in important ways" (ibid.).



In 2005, Scanlon et al. identified three facets of mobile learning as particularly significant, and these are still relevant today: *“First, that learners are on the move, moving around physically but in other ways too, for example between devices and over time, secondly, a vast amount of learning takes place outside formal learning situations and thirdly the ubiquitous nature of learning”* (p.4). In that same paper it was argued that *“Mobility and portability provide a communication channel between the technological wireless network and the social, face-to-face network, and mediate the social interaction of the participants during learning situations”*(p.5). Scanlon (2013) discusses how particular features of mobile learning can be brought into play to provide new learning opportunities in relation to collaboration, inquiry and location-based learning. Kukulska Hulme et al. (2009) writing four years earlier, describe the connection between mobile learning and context as follows. *“Context, then, is a central construct of mobile learning. It is continually created by people in interaction with other people, with their surroundings and with everyday tools. Traditional classroom learning is founded on an illusion of stability of context, by setting up a fixed location with common resources, a single teacher, and an agreed curriculum which allows a semblance of common ground to be maintained from day to day. But if these are removed, a fundamental challenge is how to form islands of temporarily stable context to enable meaning making from the flow of everyday activity”* (p. 23).

One part of context is location – and is one feature in Kukulska-Hulme’s framework as noted in Section 5.1. Scanlon (2013, op. cit.) discusses different examples of location based learning, and notes the important distinction between location-based and location-aware examples. Of course in MASELTOV, the intention is to be taking both these approaches. Learning in context and in everyday activities is an important consideration in language learning, and can both motivate learners and increase efficacy: Chen and Li (2010) suggest *“meaningful vocabulary learning occurs only when the learning process is integrated with social, cultural and life contexts”* (p.341).

Chen and Li also note that the value of context for language learning was recognised more than 60 years ago *“‘The situational learning approach’* (Hornby, 1950a, 1950b, 1950c) proposed that ‘context’ is an important factor in language learning, capable of enhancing learning interest and efficiency” (ibid., p.343).

A review of the emerging mobile language learning field was published in 2008 (Agnes Kukulska-Hulme & Shield). The authors report how at the time mobile learning had been going through a period of profound change, resulting in increased opportunities for people using their mobile devices for their language learning, often informal, as a result of more widespread ownership, improved internet access on the move and more powerful handheld machines.

We should note that this paper predated the iPhone (which arguably made a difference, particularly in driving up the usability of smart phones) and focuses mainly on small devices. Thus, the iPad, which has also emerged since and has attracted a following for purposeful planned informal learning, is not included. Thus although MASELTOV is intended to be delivered on smartphones it would be worth considering how such a service might be accessed on tablets too.

Shield and Kukulska-Hulme summarise the kinds of handhelds used for language learning and comment that resources in the literature they reviewed were essentially “one way” delivery of language – i.e. content was delivered rather than offering ways of interacting with

the language, with much concentration on vocabulary. With the development of many language resources for mobiles (busuu and Duolingo for example) the gap between informal and formal language learning is arguably also becoming more blurred.

They suggest that the affordances of mobile learning had not really been taken on board, although context was starting to emerge as an issue, and cost was clearly of importance to the learners.

The use of a language tool and service for MASELTOV, provided by busuu, is intended to support the incidental learning that happens often without the learner being aware of it happening, throughout the day. However, if the learner's attention is drawn to language features as she or he goes about their daily life, this is likely to speed up and improve language learning. Kukulska-Hulme and Bull (2009) note the evidence for this in the literature and this kind of use is consistent with their argument about the value of "noticing" in language learning. In this paper on theoretical perspectives and noticing, Kukulska-Hulme and Bull (2009, *op. cit.*) argue for the value of mobile language learning. In their section on diary keeping, they view journal keeping as a kind of first hand case study that provide insights into the learning process; what the learner notices about their learning: their reflections, highs, lows. Such noticing (their example is using the imperative) could be captured, they argue with a mobile device - and also become part of a learner model. They provide guidelines, mainly for developers.

Much of the literature on informal language learning is in the context of more formal learning: e.g. informal learning opportunities or resources have been offered in addition to the course that the learners are taking. This is the case described by Bahrani and Si (2012) who were aiming to compare audio visual mass media input for learning English as a foreign language to students who were learning through social interaction. The students who had the audio visual mass input were more successful. However, methodological weaknesses in the study and lack of information about the nature of what the participants were taught or exposed to make this a rather unreliable finding.

Other studies of informal learning concern the development of software to support such learning. One study particularly relevant to MASELTOV is that of Chen and Li (2010) who developed a Personalised Context-Aware Ubiquitous Language System (PCUKS) to teach English vocabulary to older high school students (16 years old). They build on previous work, e.g. (Dey, 2000) which showed that context-aware techniques tailored to the learning environment and content to memorise English vocabulary via mobile devices were successful in improving English vocabulary. To some extent such a system emulates some of how we successfully learn our own native languages. The main factor in such a context-aware system is location information. Following a situational learner approach the study focused on recommending vocabulary based on the learner's current location. Thus if the student is classroom-based, they will be offered words such as student, exam or assess whereas if they are in a sports ground they are offered vocabulary relevant to this context, e.g. baseball, tennis, jump. So the system uses this as the first filter and then decides on particular vocabulary based on their existing knowledge. It also takes account of the time that they have available. This prototype PCUKS system, which recommended appropriate English vocabulary was tested with 18 learners (aged 16), using mobile devices in and around their school and outperformed a comparative system that did not have the context-aware service.

The small study presented in Kukulska-Hulme, Shield and Hassan (2010) focused on a review of mobile assisted language learning (MALL) publications from 2008-9 and an online survey of language practitioners. The survey results indicate that practitioners are developing and using MALL activities, but few of them are disseminating this practice through publications or presentations.

The relevance of identity was also raised, and in terms of language learning, the wider and social meaning of learning a new language has long been recognized, e.g. Trosset (1986) argues that: “There are many aspects of language learning that exist not in the cognitive processes of learners, but in the social relationships developed between the learners and the members of the speech community which they seek to enter” (p.165). Regarding the role that learning a new language plays for immigrants, there is a wealth of research on the relationship between language and identity, e.g. Norton (2010), in discussing the concept of and the importance of learners’ “investment” in learning a new language notes that: *If learners ‘invest’ in a target language, they do so with the understanding that they will acquire a wider range of symbolic and material resources which in turn will increase the value of their cultural capital*” (p.353).

A final area of interest that we have been reflecting upon has been the concept of “ecologies of communication”. A challenge faced by the incidental learning framework is how to present activities that might take place at different times and in different places, using different tools and social contacts, and conceive these as part of a larger, connected whole (the same challenge might be said of the individual MASELTOV tools and services). To understand how the incidental learning framework might help to plan how to traverse these events and responses, one approach is to consider Altheide’s “personal ecology of communication” conceptualisation (Altheide, 1994), which itself draws upon McLuhan’s idea of “media ecology” (McLuhan, 1962). Altheide identifies that information technologies are used in everyday life and intertwine with our daily activities, both supporting and structuring social activities. By using the term “ecology”, Altheide recognises that there are spatial and relational aspects, and that there are “developmental, contingent and emergent features” (p.667): the interdependence is a fluid structure. Altheide identifies how our social interactions are both affected by and structured by ICT. Pigg and Crank, drawing on this, identify that: “... ICT has the capability to contribute to enhancing and extending social networks, providing access to resources that can be mobilized for action, enhancing solidarity in social groups, and supporting mechanisms of enforceable trust and reciprocity in transactions” (Pigg & Crank, 2004, p. 69).

Considering the MASELTOV tools and services, we can recognise that different tools may be more appropriate for resolving different challenges, and that not all will be suitable for all challenges. The idea of an “ecology of tools and services” enables both designers and end users to reconceptualise isolated tool usage and fragmented learning episodes as part of a greater whole, traversing tools, time and space. It is likely the tools will be deployed in a personal manner by each MASELTOV user; not all tools and services will be used but selections made appropriately, and interactions both discovered by the user and prompted by the recommender system. Their selection at different times and places can be mapped onto the incidental learning framework at different points to resolve the broader learner’s journey, in a ‘jigsaw pattern’ as suggested independently by one of the pedagogical experts interviewed during this period of work (see SECTION X, below: Anne Adams interview). Not all

MASELTOV tools will be appropriate all of the time, but the interaction between them will enable the journey towards social inclusion.

## 6.2 TECHNICAL CHALLENGES IN SUPPORTING INCIDENTAL LEARNING

The first version of the Incidental Learning Framework indicated that further reflection of the technical challenges of implementing incidental learning would be beneficial. While the operationalization of the MASELTOV tools and services falls to other partners and is defined in more detail within WP3, we have reflected upon the implications of the practical realisation of incidental learning in order to consider whether these challenges were sufficiently captured within the incidental learning framework.

There are a range of challenges for making technology enhanced incidental learning work within the real world. The primary challenge for recent immigrants is that of cost: both for the device, and the ongoing network charges. Analysis of how this is perceived by our target audience is currently ongoing within the WP2 activities.

Mobile learning, with its promise of providing “real-time information whenever and wherever learners need it” (Luo, Yang, Lai, & Liang, 2010) and enabling the extension of learning and teaching across the mobile environment (Attewell, Savill-Smith, & Douch, 2009) has been more of a “seamful” than “seamless” (Broll & Benford, 2005) experience until recently, with the vision of always available high speed connectivity likely to be more of an ideal than a reality. Achieving reliable network access for mobile devices, a requirement for mobile phone apps dependent on remote data resources or sharing of social information, has proved to be highly problematic (M. Gaved, Mulholland, Kerawalla, Collins, & Scanlon, 2010). While connectivity, both with respect to cellular phone networks and WiFi coverage (generally provided as standard on smart phones) has improved significantly across Europe, software developers have to consider how to provide services when only intermittent connectivity can be assumed. As well as less reliable access in rural areas, built up urban areas can also prove problematic, with limited reception while underground (e.g. on public metro systems) and ‘urban canyon’ effects reducing the accuracy of GPS receivers built into phones. The incidental learning framework, with its identification of both ‘place’ and ‘time’ as dimensions, reflects the need for software developers to consider these aspects when designing services appropriately. It is important that systems are built that take into account sporadic connectivity and are robust enough to cope with ‘seams’ in network coverage.

The reverse (high quality network connectivity) also raises issues for MASELTOV: citizens’ network activities risk being “interpreted through a lens of potential profit, not always as actual everyday practices and needs” (Halegoua, 2011, p. 329), with their data outputs providing content that can be analysed for the benefit of city managers and planners rather than citizens themselves (Mark Gaved, Jones, Kukulska-Hulme, & Scanlon, 2012). Furthermore, the tracking of this data creates ethical challenges which the MASELTOV project has to be aware of. (These are being addressed in WP2, and also through the reflective design of the tools themselves). The incidental learning framework, with its dimension of place, time, and social support, helps us to recognise that the interaction between elements, and how they are carried forward (‘learner outcomes’) needs to be considered.

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## 7. FOCUS GROUPS AND EXPERT FEEDBACK

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The D7.1.1 document identified that the Incidental Learning Framework would be strengthened by MASELTOV partners and other experts testing and reflecting on the model. The OU, as WP7 leaders, have therefore carried out a number of expert evaluation and participatory design activities since the release of this first document, to review and critique the framework. In the following section we report on these activities. We have also sought feedback through academic dissemination of this work: this is reported in WP1 deliverables.

### 7.1 PLENARY WORKSHOP SESSION, ATHENS, SEPTEMBER 2012

A session of the MASELTOV project plenary meeting in Athens, September 2012 was dedicated to a workshop on the incidental learning framework. All attendees, representing the MASELTOV organisations, participated in the session testing the framework, coordinated by the OU (Mark Gaved and Eileen Scanlon). Participants were reminded of the concepts of incidental learning and offered a representation of the incidental learning framework, and shown an example of the incidental learning framework being used to map potential tools, services, supports and learning outcomes deriving from an incidental learning situation.

Participants were divided into three groups, with the organisers ensuring a mixture of types of partner were represented in each group (NGOs as experts in migrants' needs, software developers, and educational partners). Three scenarios were introduced, derived from the WP2 Use Case Scenarios deliverable (D2.3.1). One was issued to each group. The groups were issued with Open University Learning Design Initiative (OULDI, 2012) post-it notes, printed with icons that could be used to map to each of the dimensions of the incidental learning framework. The post-it notes were developed to help formal and informal curriculum designers identify, reflect, and solve issues around course creation, emphasising aspects such as “resources” “objectives” “activities” and “learning tools”, and hence mapped well to scenario planning for the incidental learning framework, which can be considered designing for the support of very informal learning. This approach and these tools have been tested in the OULDI-JISC project<sup>1</sup> both internally at the OU and externally at other universities, with over 200 staff.

The groups were asked to read over the scenarios, each of which describing an incidental learning scenario encountered by a typical MASELTOV target audience user, and consider how these might be unpacked, and interrogated using the incidental learning framework to identify challenges and opportunities for designers (see Appendix A for these scenarios). After 40 minutes, participants were asked to report back to the group on their findings.

Key feedback points were:

- Engagement with the task and cross-disciplinary discussions over challenges and meanings: the goal of the incidental learning framework to act as a boundary object to support shared understanding of problems appeared to be achieved: one participant noted “I know nothing about learning but I managed to complete the learning task

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<sup>1</sup> “Design tools and support” [http://www.open.ac.uk/blogs/OULDI/?page\\_id=29](http://www.open.ac.uk/blogs/OULDI/?page_id=29)



using the framework tool” suggesting he found the framework useful as a bridging visualisation.

- Phrasing issue with the term “incidental learning”, confused with “incident”: the scenarios emphasised situations requiring immediate responses, and future workshops should consider learning opportunities that are not tied to crisis response situations
- Ambiguity over how the “social dimension” might be applied in incidental learning: the abstract level of the framework opened it to different interpretations
- Lack of prescriptive elements: the framework as a focus for discussion rather than defining what needs to be done and when

Overall, we noted engagement by all partners and a range of solutions to scenarios, indicating it could indeed support collaboration and learning design planning.

## 7.2 PEDAGOGICAL DESIGN EXPERTS FOCUS GROUP

In December 2012, we convened a focus group meeting of pedagogical design experts with experience in learning design and mobile learning (Professor Patrick McAndrew, Dr. Canan Blake, Dr. Elizabeth Fitzgerald). The group was presented with the same workshop format as at Athens, above. The MASELTOV project was introduced, the incidental learning framework described and presented on A0 paper sheets with OULDI post-it notes introduced. The group was asked to view three possible scenarios (those used in the Athens workshop) and select one to use as a means of exploring the incidental learning framework. Discussion followed as the group talked through their thinking processes and responses as they worked to consider the scenario through the lens of the framework.

The groups identified a twin challenge of resolving immigrants’ immediate problems and also encouraging them to undertake a more involved learning journey: the framework could be used by designers to consider how to resolve immediate challenges as well as reflective long term learning. They identified that ‘learning’ might not be apparent to the audience, rather that problem resolution would be foremost, and in a general sense the challenge for an incidental learning approach is to get users to conceptualise their situation as being a learning opportunity. One of the group, drawing from a previous project, Social Learn<sup>2</sup> suggested that encouraging “microblogging” or other means of the users capturing their thoughts for later consideration would enhance a more reflective approach to problem solving and consider how they might resolve problems in the future.

The framework was identified as being able to both map resolving “fundamental tasks” (immediate problem solving) as well as “subsidiary tasks” (mapping how a user might learn how to abstract the problem and learn broader skills). The outer dimension of “learner’s journey” was debated: whether this was too general and at a macro level, social inclusion in to a new community might be too broad to be defined. Context was considered a significant issue, the focus group identified that there can be macro-level as well as micro contextual challenges to problem resolution and these need to be mapped. The ordering of the

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<sup>2</sup> <http://sociallearn.open.ac.uk/>

dimensions themselves was also debated: whether there was a sequence of actions implied by their ordering from centre to outer ring, or if this was desirable.

The group concluded that a long scenario, to identify how the framework may work over a longer period of time, would be an interesting exercise to test how flexible it might be. This suggestion mirrored consortium discussions around the connections between tools, and was carried out at the end of the first year (see below).

### 7.3 EXTENDED “DAY IN THE LIFE OF” SCENARIO

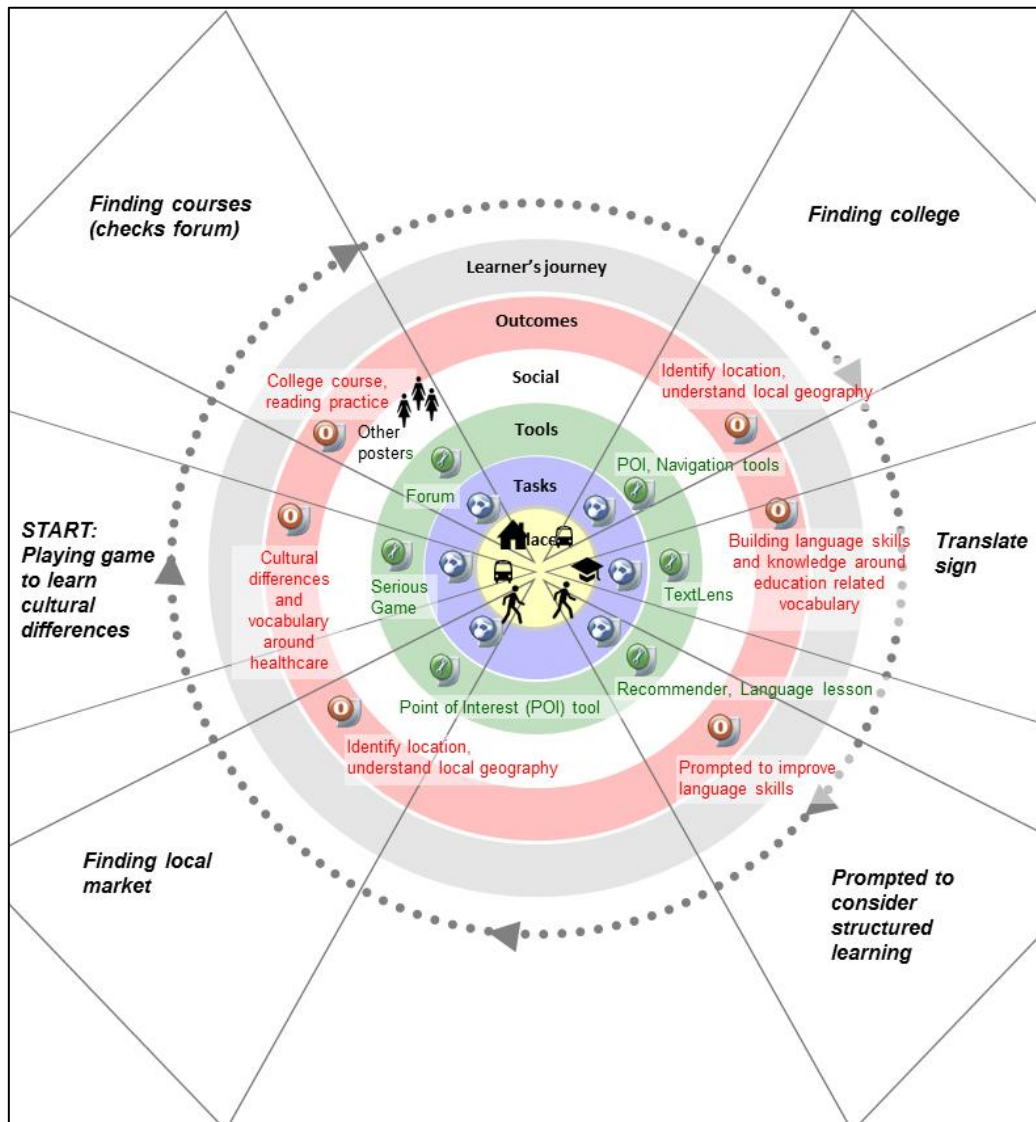
Consortium discussions around the relationship of the different MASELTOV tools and services led to conversations about how they might be described within a single, extended user scenario exploring a ‘learner’s journey’ over the period of a day. There was a realisation that tool use across an extended period might reveal linkages between tool use and possible recommendation opportunities, a perspective informed by the “ecology of communication” approach (Altheide, 1994) the WP7 team had been researching and discussing with other partners.

Mapping a day’s activities onto the incidental learning framework would enable our reflection upon the level of granularity and abstraction shown, and identify how the model could display connections between incidents, reflection and opportunities to trigger future planning: practice-performance-reflection cycles. For the first year review, this “day in the life of...” scenario was presented in the form of text and images, but also worked up by the WP7 team on the incidental learning framework.

The day in the life of an immigrant scenario is described in full detail in Appendix A. The key elements mapped to our scenario are:

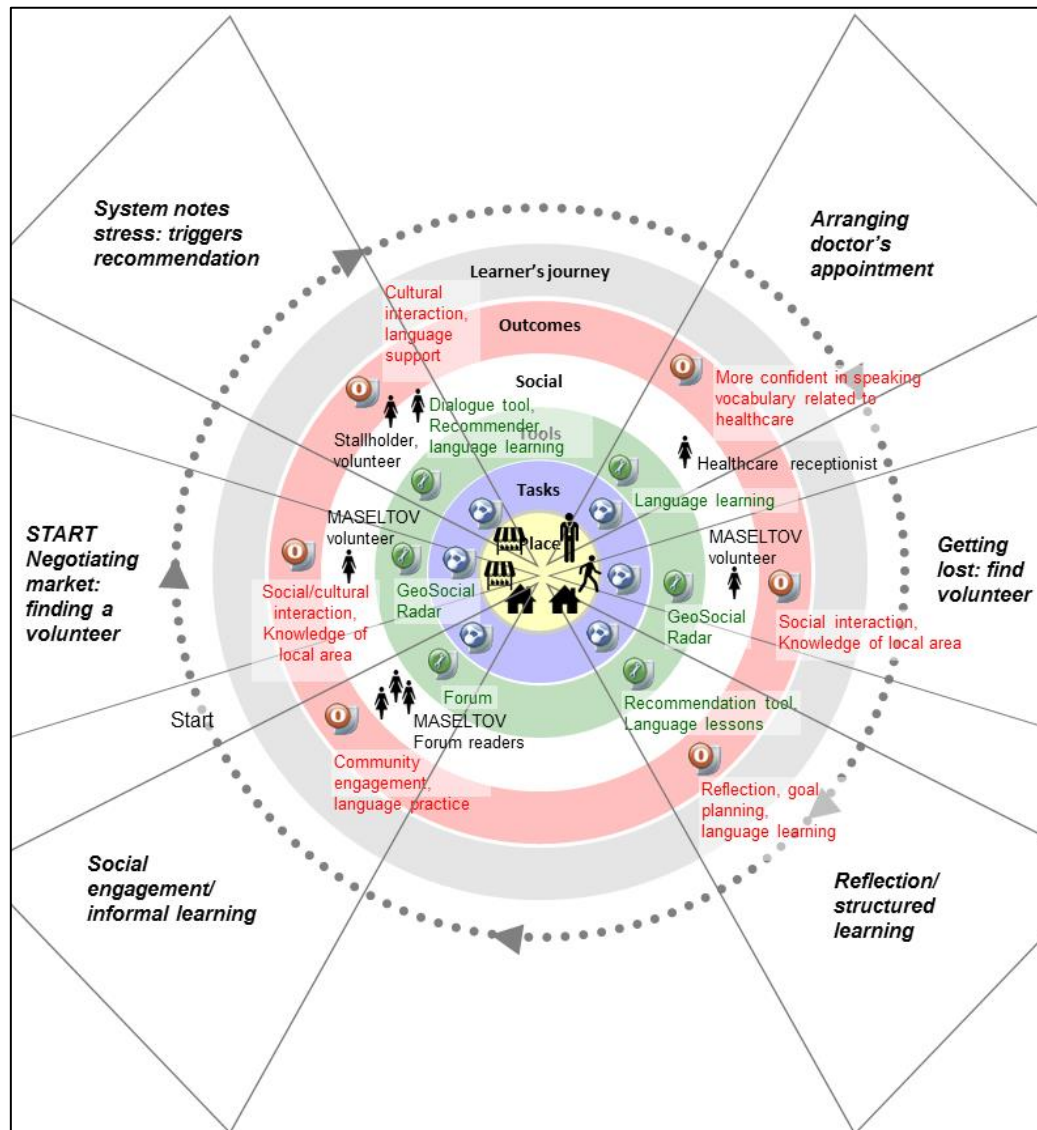
- User plays serious game on the bus to work
- Logs into forum when back at home to check messages
- Uses Point Of Interest tool, and Navigation Tool, to find and get to local college
- TextLens tool to capture, translate, and record a sign
- Recommender tool prompts learning opportunity around the sign’s language
- Point of Interest tool to find local grocery store selling Latin American food
- Geo-Social Radar to find local volunteer
- AR tool notes stress, triggers Recommender tool to suggest language lesson on ‘markets and shopping’
- Emergency vocabulary tool to help book appointment in doctor’s
- Geo-Social Radar to help when lost
- Recommendation tool to check recommendations, prompts language lessons and quiz
- Log in to forum to post message

In Figure 2 and Figure 3, the elements are mapped to the incidental learning framework.



**Figure 2:** First events in scenario mapped to Incidental Learning Framework





**Figure 3:** continued mapped to Incidental Learning Framework

#### 7.4 OPEN UNIVERSITY EDUCATIONAL TECHNOLOGY SEMINAR

The incidental learning framework was presented to a cross-departmental educational technology seminar at the Open University, attended by approximately 20 academics with backgrounds in learning design, pedagogy, software development and language learning. Discussion followed the presentation, with a number of key feedback points raised.

Debate arose about the scale of the “learner journey” – whether the incidental learning framework was trying to capture a single event, a short series of events or something much broader. As with the focus group, there was an interest in considering what could be captured at the moment of an event (or shortly afterwards) to enable the MASELTOV user to later reflect on what their situation had been, how they might react in future, and to give them an artefact they could share and perhaps debate in a social setting: the ideas of microblogging, using either a MASELTOV developed tool or a current social software service such as

Twitter were suggested. Participants suggested that MASELTOV, and the incidental learning framework, should consider these both in terms of short term reflection (same day) but also in longer terms (one or two years) to help a recent immigrant reflect across their experiences since moving to their new host country (the latter suggested by a researcher who himself was in this category, moving from Asia).

Christine Howe's work on dialogic resolution was reviewed, along with her consideration of delayed resolution (Howe, 2010), while Mercer et al.'s work on dynamic dialogic space (Mercer, Hennessy, & Warwick, 2010) was suggested as sympathetic to our approach on considering social-technological spaces (such as the MASELTOV forum tools for "generating and critically evaluating ideas, and [encouraging] explicit reasoning and the joint construction of knowledge" (p.195).

Concepts of 'scaffolding' and 'fading' (referencing Professor Luckin's work) were discussed; both in terms of how the incidental learning framework might enable educational designers and software developers to identify opportunities for these supports, but also in terms of the MASELTOV tools themselves. Device sharing across users was also identified as a potential issue, with a participant who had previously worked in an NGO supporting migrants identifying that smart phones can be shared within a family, and issues of privacy and multiple "user identities" would have to be negotiated. This point was later raised with the WP3 (System Specification) team and a resolution identified.

Finally, work carried out in the EU funded TELL project<sup>3</sup> ('Towards Effective network supported coLLaborative activities'), generating design patterns for collaborative learning, was recommended as an another approach, in which boundary objects for software developers and educational designers are generated.

## 7.5 INTERVIEWS WITH LEARNING DESIGN EXPERTS

In addition to the focus group, individual interviews were carried out with learning design experts: Dr. Doug Clow, an expert in learner analytics, and Dr. Anne Adams, an expert in Human-Computer Interfaces, both from the Open University. The experts were introduced to the MASELTOV project, our approach to incidental learning and the framework, and were shown a scenario and its mapping onto the framework. We asked the experts to reflect on our approach, and invited them to offer feedback and engage in discussion. Both experts were able to work with the framework which then revealed further issues in the immigrants' learning journey for reflection.

The first expert interview (Dr. Doug Clow) focussed mainly on two issues: the visualisation of the framework, and its theoretical underpinning. Dr. Clow questioned the relative position of the circular dimensions as displayed in the framework implied sequence: should "place" led to "tasks" and then to "tools" and so forth? Alternative visualisations were proposed: a table (See Section 8, below), rather than circle, with one column per dimension, and time as the vertical dimension, or a 'web diagram' which would emphasise scales of involvement for each of the dimensions given a particular event (high on social aspects, low on tool use, etc.). Dr. Clow suggested a simplified UML style model<sup>4</sup> might enable the consortium to analyse where focus was directed by learners at different points in time. This software approach

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<sup>3</sup> <http://cosy.ted.unipi.gr/tell/>

<sup>4</sup> [http://en.wikipedia.org/wiki/Unified\\_Modeling\\_Language](http://en.wikipedia.org/wiki/Unified_Modeling_Language)

revealed the tension in the framework: to what extent should it generate a highly defined prescriptive set of guidelines for software programmers, or should it rather be a tool for generating discussion and exposing misunderstandings and different interpretations of the same problem space through different domain experts views (similar to Howe's concept of dialogic resolution")? The purpose of the work so far has been seen to be a tool for generating productive discussions between project members and software designers.

This led to discussion about relevant theoretical frameworks. Dr. Clow felt the interplay of tools, tasks, and social indicated a heritage from Engestrom's Activity Theory, with a conversation between technical and social descriptions: a similar approach was taken by the EU funded MOBIlearn project (<http://www.mobilearn.org/>) which explored models for learning, teaching, and tutoring in mobile environments.

He suggested an alternative approach might be to consider the target users (recent immigrants) as learners entering a new community, and to consider them as joining a new community of practice (Wenger, 1998). Their gradual integration into their new community might be considered an act of legitimate peripheral participation (Lave & Wenger, 1991), with not only their language mastery but also increasing cultural and social integration enabling them to perform and contribute as full members of their new society. Extending the social aspect, Dr. Clow suggested a connectivist learning approach (Kop & Hill, 2008) would be appropriate for MASELTOV, which is also referred to in the literature review, Section 6.1.

A second interview was held with Dr. Anne Adams using the same format. Dr. Adams' background is software design and HCI, and her response focussed on the challenges the OU pedagogical team, and the incidental learning framework would have in communicating with software designers. She advised that technical contributors to a MASELTOV design process might not see how the Incidental Learning Framework would add value to their mode of working and that this would prove to be its greatest challenge for adoption.

Dr. Adams suggested identifying how the incidental learning framework might fit into existing design cycles to support its adoption within existing practices. Examples of software design models suggested were: user centred design, interaction design, and requirements engineering. Dr. Adams suggested the existing MASELTOV work carried out by social scientists and educational researchers might map well, once the similarity between approaches has been identified. Testing of the framework has been carried out and is described in Section 8, following.

Dr. Adams suggested that a 'jigsaw model' approach might be useful for viewing how the MASELTOV tools and services could be used, and also mapped onto the incidental learning framework, to conceive the overall learner's journey (social inclusion) as being resolved at different times and places by different tools, with not all tools required for all challenges, but when brought together helping solving the greater whole. The incidental learning framework could therefore be used to help identify which challenges could be resolved by which tools, and where the connections and gaps were between the current tools. Dr. Adams asked what triggers the connection between tools ( response: in part, the User Profile and Recommendation engine, WP5, but also an agreement the learning design might have to engineer connections between tools). Dr. Adams noted that this required an iterative process, so highlighted the value of the WP7 incidental learning team working with the evaluation processes, and also considering longitudinal studies to explore incidental learning over extended periods of time.

Other approaches Dr. Adams suggested we should consider for future developments include the Human-Computer Interaction concept of ‘interactional trajectories’ as a means of considering user journeys (Benford, Giannachi, Koleva, & Rodden, 2009). While an educational approach is to consider an immigrant’s journey to social inclusion as a ‘trajectory’ from outsider to community member, the software development world reflects upon how a number of computer interactions and events, when considered together, might “take their participants on journeys”, and “[w]hile these journeys may pass through different places, times, roles and interfaces [...] they maintain an overall sense of coherence; of being part of a connected whole” (ibid, p.712). Another approach for guiding learners could be ‘orchestration’, used in education “both [in] the musical sense of the word, as the prior arrangement of a performance, and the alternative meaning, of dynamic management of people and activities to achieve some productive and harmonious result” (Sharples & Anastopoulou, 2012, p. 70). This approach also makes use of visualisations of learner journeys, to design and analyse potential points of interactions and technology mediation (Collins, Mulholland, & Gaved, 2012). Dr. Adams further noted the concepts of scaffolding, and fading (e.g. Luckin 2010), which has already been described previously. In order to better understand user interactions with the MASELTOV tools and support iterative development, Ann suggested that that longitudinal evaluation studies would be valuable, and considering tools familiar to HCI researchers, suggested cultural probes (Gaver, Dunne, & Pacenti, 1999), a variety of artefacts sent to participants “to provoke inspirational responses” (p.22), diary keeping, and technology probes, which “involve installing a technology into a real use context, watching how it is used over a period of time, and then reflecting on this use to gather information about the users and inspire ideas for new technologies” (Hutchinson et al., 2003, p. 18).

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## **8. PARTNER TESTING**

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Further to expert feedback, the OU team sought to gain feedback from the MASELTOV developers of tools and services: interrogating their proposed developments against the incidental learning framework to enable exploration of how the services might function in context-driven situations and interact with other services. Following the expert interview with Dr. Clow and Dr. Adams, it was decided to present the partners with the incidental learning framework in tabular format. The exercise was introduced at a project plenary meeting, and followed up with email instructions and templates to complete. This task is on-going with encouraging results, and is acting as the basis for continued dialogue. We present the current initial feedback in Appendix B.

### **8.1 TEMPLATE FOR TESTING**

Figure 4 shows the template devised to ask partners for mapping their service against the categories of the Incidental Learning Framework. An extended version was presented to project partners, with an example use case filled in. Partners were asked to return the completed template to the OU with any comments on the exercise or challenges they had faced.

Example of tool's use	Name of use case (e.g. "looking for local doctors")	Place: Which places could you use it – or not use it? (e.g. privacy, connectivity)	Task: What purpose would you use it for?	Tools/content: what content or tools does the user need to use your services (e.g. conversation with local, other software)	Social support: Who can the user share the task with, or ask for help?	Time: When can it (not) be used? How long does it take to use?	Learning outcomes
Event/ Incident/ User Case #1							

**Figure 4:** Template incidental learning framework tabular view for software partners

## 8.2 SUMMARY OF PARTNER TESTING

So far, developers from over half of the services have tested their services against the incidental learning categories (GeoSocial Radar, Augmented Reality Navigation Tool, Serious Game, Discussion Forum, Language Learning).

Responses so far indicate that the developers are focusing on technical aspects, and on the specific challenges faced by their services. There is recognition of how their individual services play a role in a larger learner's journey towards social inclusion, though it would appear that that a more multi-disciplinary interrogation is required, bringing in the social and educational focussed partners to help identify potential linkages between tools and the means in which learner journeys can be maintained when moving between tools.

We will continue to gather reports from the software developers and then present the results, with the intention of engaging educational and NGO partners for their review and reflections. From this, we may be able to identify possible linkages to build between tools that may prompt higher level activities such as goal setting, planning, and reflection.

## 9. LANGUAGE LEARNING AND INCIDENTAL LEARNING

In the first description of the incidental learning framework (D7.1.1) we described busuu.com's model of language learning as presented in their current website. The development of the incidental learning framework has informed the project's thinking about the delivery of language learning activities and content for recent immigrants and we summarise key insights below.

**First of all, we recognise the critical role that language learning plays for the social and cultural inclusion of immigrants.**

Second language acquisition is perceived by adult immigrants "as a crucial factor for socio-economic and cultural integration" (Kluzer, Ferrari, & Centeno, 2011, p. 9) with language acquisition and social integration closely intertwined (Van Avermaet & Gysen, 2009). Limited language skills act as a barrier to many activities required for successful integration, such as finding a job and becoming part of a community. Harder (1980) writes of the



“reduced personality” of the second language learner who has a limited linguistic repertoire at their disposal, while recent literature considers this issue in relation to negotiation of identity (Riley, 2006; Taylor, 2011).

**Second, we have identified that learning in context is a critical aspect of an incidental learning approach.**

The mobile phone will allow access to language learning activities in a wide range of contexts, enabling a much more situated learning approach. Recent research conducted by Hwang & Chen (2013) investigated how familiar situated contexts can facilitate language learning, such as learning food-related vocabulary during lunch in school. Learners can repeatedly listen to recordings in familiar situations, giving them more opportunities to practise and also interact in the target language with others. Crucially, learning is not only a deliberate event – in the cited study, “learning also took place spontaneously in [the learners’] daily lives” (ibid, p.101). Similar opportunities exist for MASELTOV mobile service users who will be able to take advantage of situated contexts for language learning and integrate it with their daily lives.

**Third, an interrelated set of tools and services can sustain language learning and provide an enhanced experience.**

MASELTOV’s user profile and recommender services allow the language learning to prompt and be prompted by other services and thus create a richer learning experience. There is a great opportunity to extend learning across a range of tools and services, and utilise the functionalities available in these, such as capturing images and posting them to forums, identifying locations visited, and requesting help and responses from a larger community. Whilst one tool can serve more than one learning purpose, an integrated suite of tools and services is more adaptable to different learners and situations.

**Fourth, language activities need to be tailored to the time frames experienced in on-the-move and incident response situations.**

For learning on the move, we are now considering learning activities of 15 minutes or less, and we are exploring how short, emergency response resources for beginners, such as emergency vocabulary and key phrases, can be integrated into the language learning services. The brevity of such learning episodes emphasises the importance of developing tools that record detailed progress and allow for interruption, yet trigger future learning events. We have identified that learning episodes can be more fragmented and chaotic within incidental learning so it is very important to incorporate tools that link together and extend these into a more coherent longer term journey. The learning also depends on a learner’s own motivation, so appropriate feedback and progress indicators will be critical (see Deliverable D7.2).

**Fifth, the content of language learning lessons and assessments of language acquisition need to be adapted to situated learning requirements.**

The idea of language “lessons” will be familiar territory for most immigrants, however the content of such lessons needs to be reconsidered in light of situated learning requirements. Language content, such as situational dialogue designed for classroom practice, is frequently inauthentic with regard to informal language use, interruptions and abbreviations. Tracking language acquisition is also a challenge in informal learning. Reporting on his investigation of informal online learning of foreign languages, Sockett (2013) notes that while the practices of the informal learning of English online are now well understood, “*the language acquisition which results requires more detailed research*” (p51); he explains that this is because attentional constraints and factors such as the private nature of informal language activities

make data collection more difficult than in a classroom setting. We therefore recognize that an informal learner's attention will not always be entirely focused on learning and some informal learning is going to be private. Tracking language acquisition will not always be advisable or possible. When the learner is happy to be tracked or monitored, then Feedback and Progress Indicators can be used to capture aspects of language acquisition (see deliverable D7.2).

**Finally, we recognize that immigrants' cultural backgrounds can sometimes be a barrier to adoption of mobile, contextual language learning.**

Although second language acquisition aids cultural learning, immigrants' cultural backgrounds may sometimes be an impediment to adoption of mobile and contextual learning. Hsu (2013) found that study participants with different cultural backgrounds had varying attitudes towards mobile assisted language learning. Many doubted that they could practise all language skills in a mobile learning environment. For those cultures that greatly respect the status of teachers in the classroom, learners might find it hard to accept that teachers could be replaced by technology. However there is also growing evidence that self-paced learning using a personal mobile device can enhance the acquisition of language material over a group-oriented approach (Oberg & Daniels, 2013). We conclude that an incidental language learning approach challenges established practices and its acceptability is likely to vary depending on each immigrant's cultural background as well as other factors.

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## 10. SERIOUS GAMES AND INCIDENTAL LEARNING

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In the previous version of this deliverable, we introduced the concept of serious games as an informal learning mechanism. We identified both how they might support the target MASELTOV audience in fostering social inclusion, as well as considering how the key concepts of incidental learning might be applied within serious games, particularly with the specific case of the MASELTOV services.

In this document, we examine progress made with the MASELTOV serious game with respect to its implementation as an educational tool within an incidental learning approach to learning and teaching.

We describe how concepts of incidental learning have been applied within the games development, and issues that have been considered since D7.1.1. It must be borne in mind that the game is still under development, with the first deliverable due in month 24, so this is still work in progress: one of the challenges of the MASELTOV project has been the parallel development of both theoretical work and practical implementation.

### 10.1 UPDATE ON RESEARCH FINDINGS

In the previous document, we noted the paucity of objective, empirical evaluations of game-based learning (Dunwell, Jarvis, & deFreitas, 2011). We identified that key elements included a Vygotskian approach to learning, reflecting on the central role of play and abstraction in learning (Vygotsky, 1978). We noted the importance of feedback (Skinner, 1948), enjoyment and fun (Zyda, 2005) and the flow experience (Csikszentmihalyi, 1997).

We have carried out further academic research into theoretical backgrounds suitable for supporting serious games as part of an incidental learning approach to supporting social inclusion in the context of developing a sustainability game for enhancing participation and engagement on sustainability issues in public spaces. The overarching conclusion from the analysis of the game uptake is that it may enhance student's engagement with sustainability issues, especially in blended learning contexts for 'blending' different pedagogical approaches with tools and media as means of improving the educational practice. For a more detailed discussion see (Lameras et al., 2013).

The following theoretical elements have been considered since the delivery of D7.1.1.

**Cultural dimensions:** We are exploring Hofstede's cultural dimensions (Hofstede, Hofstede, & Minkov, 2010), and other research on intercultural learning and considering outcome from DGEI Cluster and other relevant projects, such as TARDIS (<http://tardis.lip6.fr/>). Hofstede's cultural dimensions have been used as a theoretical framework for understanding users' cultural experiences. In particular, we are using Hofstede's four cultural dimensions as a framework to help users to understand variation in different societies in relation to their own.

**Games as motivational:** We consider fun and enjoyment as important to encourage continued learning by incidental learners; however, there is the challenge of 'fun vs. learning'. Game researchers and practitioners alike have explored the use of games as means of motivating and engaging students in the learning process (e.g. Mayer et al., 2012). Games tend to be fun and entertaining by nature and the challenge is to retain their playful character when they are used for teaching and learning purposes. However, intrinsic motivation and the anticipation of fun may influence actual enjoyment during and after playing the serious game (Mayer et al. 2012) and we are developing prototypes to emphasise these aspects.

**Importance of feedback:** We recognise the importance of not only feedback to games players, but also gaining feedback to support developers to enable them to improve the game (Dunwell et al., 2013; Dunwell et al., 2012; M. Gaved et al., 2013). A key method for enhancing the learner's experience is to help designers and developers of the serious game to improve it through user feedback to the system. This approach requires that the developed games encompass data analytics mechanisms (e.g. stealth analytics) which can gather appropriate data in terms of specific practices and processes the user is enacting in their game activity.

**Virtual currencies:** Derived from the video game concept of players collecting virtual currencies in game to purchase virtual items, and now used in learning language websites for similar purposes, we are investigating using virtual currencies in MASELTOV's serious game as means of increasing motivation, engagement and support. The basic concept is that players can acquire items by certain activities in the game (e.g. collecting virtual coins). In-game currencies can be used to buy different game elements (e.g. characters, environments, abilities, clothes, etc.). Nojima (2007) gives some examples between virtual currencies and players' motivations for playing the game, arguing that players who uses virtual coins to buy in-game items report high-levels of immersion within the game. There are different motivations for using virtual currencies as means of buying in-game goods such as: level advancements; advantage in a competitive setting and content customization among others. Increasingly challenging content may also be enhanced through the inclusion of virtual currency as the concept of game content is constantly changing, aimed at establishing social interactions and hierarchies (Hamari & Lehdonvirta, 2010).



**Games genres and their impact on learning:** we are exploring different types of games and how these may influence learning. Simulations and puzzle games seem to be the most prevalent for designing and implementing serious games (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012).

**Serious games in online environments:** Since the 1990s serious games have been used in the form of massively multiplayer online games (MMOGs). For example Hew and Cheung's (2010) review on studies that focused on immersive three dimensional online worlds in learning settings found that most research was focused on learning outcomes, collaboration and the affective domain. Learners seemed to favour these online environments but technical problems were prevalent like accessibility and communication. Further research is needed in order to better understand the sociocultural factors in online serious games.

**Scaffolding for support:** Appropriate scaffolding may be provided in games through the use of levels. For example certain supports can be embedded into games; the easiest levels are played first, advancing to more complex levels as the players achieves advanced game skills. Other scaffolding may be achieved through visual and textual directions in terms of how to achieve certain activities in the game.

**Incorporating the game within the MASELTOV ecology of tools:** We are considering how the serious game can be incorporated within the "ecology" of MASELTOV tools in a way that might encourage users to move between tools and services. We see the use of a virtual currency as a promising direction for our research. As we discussed previously, the player will be able to collect and use virtual coins in the serious game for in-game purchases. In order to encourage the use of other tools within the MASELTOV ecology, we are considering how the user might be able to use the coins collected in the MASELTOV game for buying features and content related to the different services of the other MASELTOV tools, and similarly, collect coins in other services to use in the game. Our goal is to encourage playful interaction with the different services and trigger exploration of the range of services.

In D7.1.1 we identified a number of challenges we will have to address with respect to serious games, and we now turn to reflect on the development of our thinking with respect to these areas.

**Challenge 1** "Moreover the consideration of to what extent incidental learning is emphasized in development, and if it should assume priority in any conflicts with the formal or informal pedagogical structure of the learning experience, should be considered."

This challenge is being addressed through a number of in-game mechanisms:

- Goal setting is reinforced through the game's narrative and setting. The player is presented with clear tasks and objectives alongside positive reinforcement mechanisms such as the award of spendable in-game currency. This currency can be spent on practical and cosmetic upgrades allowing for the player to work towards clear achievement goals.
- Reflection on learning is anticipated to be supported through supplemental materials and links from the game to other MASELTOV services, including Busuu's direct educational content. The game is intended to be as accessible a resource as possible,

therefore the aim is to integrate this material as an optional and inobtrusive, but still visible, background resource.

- Motivation of continued learning is targeted through the creation of entertainment game content in concert with educational material, with the cultural learning in game scenarios including travel, healthcare, jobseeking, and shopping transposed into an entertainment gaming content (e.g. jobseeking becomes finding an in-game mission, healthcare healing the player avatar). Puzzle/platform levels are used as a basis to motivate play and provide entertaining substance beyond the immediate abstract cultural learning scenarios in the aforementioned four contexts.
- Individual tasks within the game, for example obtaining information at the travel hub to navigate to other areas, are encapsulated within a broader narrative. In this narrative, two separate "dimensions" have emerged as the result of a disaster, and the player is afforded the sole capability of transitioning between these two dimensions. In doing so, they experience the travel/shopping/healthcare/jobseeking content in two very distinct cultures, informed by Hofstede's cultural framework. Individual objectives within these various content areas are contained within a wider 'journey' through the game in which the learner observes the problems in relating to different cultures, and also how "a culture which seeks to be exclusive cannot survive".

#### **Challenge 2:** Assessment / evaluation of user progress a challenge

- Challenge of proving learning development occurring in simulation environment (the serious game) can be transferred to the real world

Metrics will be implemented in the game to record player actions. The player will then have the option to upload this data to support research activities, with appropriate informed consent materials supplied.

This will be implemented in a broad approach which captures both low level (e.g. where and when they tapped the screen) and high level (which elements of content they completed) elements. Quantitative analysis of this data when the game is live would be expected to contribute substantially to the further development of the game, informing the designers on which parts are used the most, rates of player progression, and need for new content.

A central research goal is linking this to concrete evidence of impact on cultural perspective and learning. Mapping quantitative metrics (e.g. how long did people play for), to qualitative observation of a smaller sample through the user studies within MASELTOV (e.g. in qualitative studies, how long did people who reported significant changes in perspective play for and which parts did they play?), could provide indicative evidence. A quantitative model might also be derived in concert with other services, e.g. seeking to correlate usage of the game to increased mobility through capturing their movements on the mobile device. Finally, the ability to reward currency in-game will be explored as a means to incentivise self-reported surveys on players' behaviours.

**Challenge 3:** Gamification of education a growing trend: use this in evaluation: badges. Could be used in MASELTOV serious game as a means of denoting progress to the wider MASELTOV community: value of social learning.

“Given the importance of social support in reducing "culture shock" for migrants (Pantelidou & Craig, 2006), such gamification might emphasize the social aspects of these situations as

well as how the overall perspective of the migrant might be adjusted through experiences within the game.”

“Flexibility, therefore, exists primarily in the **pedagogic** dimension: the incidental learning framework must be shaped to address the challenges posed by the constraints of these remaining dimensions.”

We are developing a single player game, though it will have community elements (for example linking into the MASELTOV social network, and providing a leaderboard based on volume of currency obtained. The game emphasizes the social aspects of cultural learning though character-based interactions using multiple choice dialogues, which accentuate the cultural differences noted by Hofstede's cultural dimensions. Through observing the differences in these dialogues for different cultures, and also how responses are received as the player communicates with other characters, the overall perspective of the migrant on cultural differences is expected to be adjusted through an experiential learning model. This will be reinforced by incidental learning, implemented across MASELTOVs wide range of services and tools.

In D7.1.1 we presented a table that indicated a mapping of incidental learning concepts to serious games. We now offer an updated version indicating how the progression in the MASELTOV game concepts map to this original table, and have added a third column to capture current thinking (See Table 2, below).

<b>Incidental learning event characterisation</b>	<b>Relationship to game-based learning</b>	<b>MASELTOV serious game development</b>
The place the incident (and structured learning, planning or reflection) occur;	Mobile games are commonly played to pass time during travel or periods of waiting, and are less likely to be played in the home than more static gaming platforms such as consoles.	MASELTOV game could be played in formal (schools, universities) as well as informal learning environments (e.g. home). MASELTOV, though a mobile game can enhance incidental learning across different settings
The task(s) the learner is attempting to carry out;	A learner in a high-stress environment attempting a culturally-challenging or social task is unlikely to be simultaneously engaged with the game; however, prior to attempting the task, for example whilst travelling to a meeting, a game may be engaged with.	Tasks within the MASELTOV Game have been designed in a way that combines fun with learning.

The social support that the learner can or does make use of;	Potential exists to foster a gaming community to build this social support structure. This may emphasise the game, rather than its serious objectives, however.	A social space is being designed in the main hub area where users can see each other scores and give feedback on players' performance / learning outcomes
The tools (including content) the learner can or does use to complete the task;	Assuming a mobile platform is present, potential exists to branch off from the game into additional or supplemental resources.	Within the game, the player only requires a basic understanding of the language for their current localisation. However, they will have access to language learning content from Busuu, and other services will be linked to throughout the game as relevant.
The learning outcomes that the learner wants to achieve	Game-based content is likely to be tangential to required learning outcomes and might be perceived as an inefficient or less useful resource for a motivated learner. Therefore a key target audience is less motivated learners, or those seeking to learn general principles rather than achieve specific learning outcomes.	MASELTOV Game is designed to have a general learning outcome supporting more specific learning tools: for example, some language learning activities will be undertaken that link through to the MASELTOV specific language learning tools, as well as the key learning role of teaching an understanding of basic cultural differences.
The (relative) time the incidents (or structured learning, planning or reflection) occur;	Game design can exert a degree of control over the frequency with which the game is played by designing for a specific play duration, and constructing longer-term engagement through sessions or supportive technologies such as leaderboards, communication between peers, or similar social tools.	MASELTOV Game includes leaderboards, inventories for adding new abilities and randomised control levels which facilitate the process of retaining engagement during playing the game.

**Table 2: Mapping of incidental learning concepts to serious games**

The framework has been helpful in evaluating these issues, but reveals that further dialogue, drawing in other partners, would enable discussion about linkages between services and an exploration of how to pedagogically incorporate the serious game into the broader ecology of MASELTOV services.

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## 11. CONCLUSIONS AND RECOMMENDATIONS

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In this deliverable we have described the continuing work that has been carried out to develop the incidental learning framework for facilitating the creation of technology rich learning opportunities for recent immigrants.

We have analysed further relevant literature and used it to inform the structure of the framework, exploring theories and research related to informal learning, languages, and serious gaming. We have put forward the case that incidental and game based learning need to be blended into a wider ‘learner’s journey’ that incorporates a range of tools, services, and support to be most effective, and shown how this is reflected in the incidental learning framework.

The initial research presented in D7.1.1 has been tested through expert review (focus groups, interviewing, and MASELTOV partner engagement) to critically review the technical and pedagogical requirements for supporting incidental learning. We have identified that an incidental learning framework can enable design conversations between software developers, pedagogical designers, and NGO partners on the MASELTOV project. These conversations can interrogate scenarios both at micro level (e.g. a single event that may be resolved with aid of a MASELTOV service) and the macro level (considering the progression towards language competency over time).

Engagement with software developers and others suggested that the framework generates helpful discussions about the learner journeys which immigrants might make.

The extent to which working with the framework generates a set of guidelines for software programmers to implement is not straightforward. To some extent the framework is better understood as it a tool for generating discussion to aid the planning of learner journeys and better at exposing misunderstandings and different interpretations of the same problem space through different domain experts views (similar to Howe’s concept of dialogic resolution”).

The current representation was sufficient to engage participants and encourage discussion.

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## APPENDIX A: “A DAY IN THE LIFE OF...” SCENARIO

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In Section 7.3 we note an extended whole-day user scenario was generated to enable partners to discuss the interaction between the MASELTOV tools and services. The goal of generating a whole-day scenario was to extend the user scenarios generated in WP2 (that were focussed around shorter time scales) and create a longer scenario that might encompass a large number of MASELTOV services. We hoped this would enable us to interrogate the interplay between different services and also reflect a wider range of contexts in which the services might be encountered.

The full text of this scenario is presented below.

“Maria has recently moved to London from Colombia, she has been living here for 3 months. She is 24, and was educated to secondary school level and has experience working as a shop assistant in Cali, Colombia. She comes from one of the villages surrounding Cali.

She moved to London with her two children to join her husband. She intended to work to help support her family but when she arrived she could only apply for jobs which did not require much English. With only a few contacts in London – her husband and others from her own community – she only found out about jobs through word of mouth, and these were mostly in catering or cleaning. She is now working as an office cleaner and the family all live in one room in a shared house with two other families from Latin America occupying the other two rooms. She got her job through a friend already working as a cleaner so did not gain any experience of applying for jobs in the UK. A friend at church has told her about the MASELTOV app (“Mapp”) and she has discovered it has a number of useful tools and services that help her in her daily life.

Maria is woken up at 5am by the alarm on her smart phone: like many young people she owns a smart phone and uses it for lots of purposes, not just for calling or texting friends. She gets the bus to start her job as a cleaner; there is no other transport at this time. On the way to work, she plays the MASELTOV serious game “Dimensions”. She is playing the “healthcare”

puzzle at the moment, because as well as being fun, it's teaching her about vocabulary and cultural aspects of getting support at the doctor's in the UK: she needs to take her son to have a vaccination in the afternoon and so it seems like a suitable challenge to take on in the game.

After her cleaning job, she takes her children to school, and has a little bit of spare time. She logs into the MASELTOV forum as she posted a message there yesterday to ask about how to improve your job prospects. Somebody had recommended taking an IT course, and Maria has sent her a private message to tell her if she can recommend any colleges near the area she lives. The poster has sent a private message back indicating one they think is good. Maria uses the MASELTOV Point-of-Interest navigation tool to direct her to the college, and finds it is not too far, so she decides to go there, as she has been given directions for which bus to catch and how to walk there.

On arrival, she finds the college library is closed. Using the TextLens tool, she takes a photograph of the notice on the door, and uses a translation tool to understand what is said: the notice tells her that another building nearby is open for course registration. Maria records the words in TextLens, to enable the Recommender tool to suggest language learning exercises around these words later. She then goes to the office where she can register, and joins the class. Maria has just enough time to stop in at the shops on the way to picking up her children, and checks to see if there are any shops that sell Latin American groceries on the way. The recommender system suggests a local market, and suggests she gets in direct communication with a volunteer in the market. At the market, the volunteer helps her find somebody with the ingredients she needs for her recipe. She decides to record her conversation with the stall holder (with their permission) so she can listen back and reflect on how well she can communicate her requests. The MASELTOV dialogue recognition tool tracks the conversation and indicates that it identified Maria was stressed in her interaction and not focussed: providing her with some feedback about how she can improve her conversational competency. As a result, the recommender tool suggests to Maria that she could take a "markets and shopping" language lesson; Maria presses a response button to note she might do this later.

Maria then picks up her children from school, and goes to the doctor's to get the vaccination for her son Santana. While she is waiting, she uses the MASELTOV emergency vocabulary tool to check some language to help her request a future appointment, as she is worried about his weight and small size. This helps her arrange another appointment with the receptionist. When she gets to the metro station, she finds there is a problem with the service and she decides to walk home. However, she takes a new route and gets lost, so she decides to use the MASELTOV GeoSocial Radar to find a volunteer who can help her find her way back. The service proposes two people nearby who can help, and Maria chooses to ask a female volunteer, Kate, who has a high trust rating. Kate helps her find her way back on to her route home.

Back home, she makes dinner, and puts her children to bed. Having a few minutes to relax, she decides to practice some of her language skills and checks the MASELTOV Recommendation tool for outstanding recommendations. She decides to practice a vocabulary lesson around healthcare, and also try a quiz on "markets and shopping". She then logs in to the forum and posts a message to the person who recommended the IT course at the college, and thanks them. It is now getting late, so she sets her alarm on her smart phone, and goes to bed."

## APPENDIX B: RESPONSES FROM PARTNERS ON THEIR SERVICE USE

As part of the process of developing the incidental learning framework and exploring the interaction between the different MASELTOV tools, software developers were asked to consider how their tools might be viewed through an incidental learning lens. Below we list initial responses from a number of the partners. These will be taken forward and interactions and gaps explored as we integrate an incidental learning approach into the MASELTOV services.

<u>Example of tool's use</u>	<u>Name of use case</u> (e.g. "looking for local doctors")	<u>Place:</u> <i>Which places could you use it – or not use it? (e.g. privacy, connectivity)</i>	<u>Task:</u> <i>What purpose would you use it for?</i>	<u>Tools/content:</u> <i>what content or tools are needed to use your services (conversation with local, other software etc.)</i>	<u>Social support:</u> <i>Who can the user share the task with, or ask for help?</i>	<u>Time:</u> <i>When can it (not) be used? How long does it take to use?</i>	<u>Learning outcomes</u>	<u>How it supports overall learning journey</u>
<b>Discussion Forum</b>	Asking help to interact with local authorities	Anywhere (with internet connectivity )	To solve issue, to learn regulations, to ask for information.	Phone keyboard and an active Internet connection	Other forum users,using forum itself and provided share buttons on Facebook and Twitter	Any time. Posts will be stored and showed as "new" to forum users and indexed by internal search engine	To learn local laws and verbal terms used to interact with local authorities	Provides resource for discussion with others on cultural / language interpretations
<b>Geo- Social Radar</b>	Find a near volunteer able to give assistance on specific field	Anywhere (with GPS or WiFi)	To receive an assistance that requires,in most cases, the physical presence of the volunteer (the searched volunteer is not far)	smartphone (Android) active Internet connection, GPS coverage or/and WiFi connection , chat with other people (volunteers)	Contact available volunteers by means of chat and thereafter meet him	Anytime the user needs assistance and there is a volunteer available.	To learn places, habits, language tricks via the volunteer's experience/ knowledge.	Provides a tutor when required. Afterwards the user can access again GeoRadar to see the list of "received" assistances and to discover the fields in which he has needed to be supported
<b>Augmented</b>	Navigating	It can be	To get intuitive	The	No social	Can be used any	Familiarisation with	Familiarity with local

<b>Reality Navigation</b>	across unknown places	used wherever the Navigation Service from FLU is available (currently Vienna, London); requires network connectivity and GPS	non-verbal navigation assistance at decision points like road junctions	ARnavigation software component needs the following sensors: camera, GPS, digital compass, accelerometer and WiFi. It further needs the route provided by FLU Navigation service and map data from backend servers.	support (single user tool)	time.  Maps need to be downloaded from the internet in advance of use	local area	area can give users confidence to explore their neighbourhood and come into contact with the local social and cultural activities, enables social engagement and job hunting. Supports by guiding users to a relevant location where potential learning could take place.
<b>Geo contextual awareness</b>	Context recognitions from sensor data	Everywhere. Quality of context recognitions depends on the availability of location based information from external open online databases (i.e. POIs) and available	Runs in the background and delivers context information to the user profile which could be used from other components – mainly the recommendation engine	Needs the following sensors: GPS, digital compass, accelerometer, WiFi barometer, microphone. Needs phone interaction patterns like browser history, phone calls/SMS statistics	(individual use, software running on user's smart phone)	It can't be used on demand by users – it runs all the time in the background. Some recognition types need an internet connection	Underpins other tools and services and adds value to their services	Geo-contextual recognition will be stored in the user profile and could be used to deduce learning content/lessons of interest from recognitions like "situations faced" or "interests" or "history of visited places" or "mode of transportation"

		sensor information						
<b>Language learning Services (lessons)</b>	Meeting and communicating with other people	Anywhere: on the go or in the comfort of your own home	To learn a language or to search for language tips on the spot or when in the situation	Alone or in conversation with others	The user can post questions within the discussion board/social network or just have a conversation with others	Can be used at any time	The learner would improve his comprehension /listening/reading and speaking skills	It helps the learner better integrate in his social surroundings allowing him to communicate with others
<b>Language learning services (in vivo dialogue evaluation)</b>	Getting quality feedback on a voice captured dialogue	Crowded places with local citizens for practice: market, bus stop, shop, local government office	To train awareness about how a good dialogue should be led: understand principles of dialogues; to motivate immigrants to take the experience of dialogues at all	Post processing analysis of pitch, sound and speech recognition; together with emotion, stress and eye contact analysis (cf. Dunwell et al., 2013).	Joint analysis with the local citizen is possible and would support the interaction for social inclusion	Can be used anytime; it needs the smartphone, the Mapp, and an agreement between the immigrant and the local citizen user to capture the dialogue between them.	Improved dialogue techniques, increasing the readiness to enter into dialogues and raising the confidence of the immigrant in leading a dialogue.	It helps the immigrant to perform better in the task of a dialogue, and also integrates the user into the social surrounding.
<b>Serious game: cultural understanding and learning scenarios</b>	Understanding cultural differences	Anywhere, indoors (Home, office), outdoors (at a bus station, park, on the road)	To understand variation in cultural differences between individuals	A computer or a mobile device (Android) running the game.	Single player game, but the user can ask question through the game's social space and/or through the FAQ section within the game and communicate with other MASELTOV	Can be used at any time. This element is part of the game's randomized control level and it takes about 20 minutes to complete	The learner would be able to understand cultural differences amongst people from different cultures within the context of: travelling. Finding a job, health and shopping	It helps the learner to familiarise with the new culture, understand its processes and practices and prepared for being part of the broader community.



users								
<b>Serious game: language learning</b>	Translation challenge: translating words in a chosen second language to earn game points	Anywhere, The game will be available via a tablet/ phone.It may be used with or without Internet connectivity	Learn simple words in fun way through playing a Serious Game. Vocabulary building	A computer or a mobile device (Android) running the game.	Game scores can be shared online through the MASELTOV online social space.	Can be used any time the player wishes to. It takes approximately 30 min to play the game	Capture words for language learning and rapid feedback using game mechanics and features. Can encourage use of MASELTOV language learning tools	Provides an awareness of simple words that the player may use during his visit/location in a foreign country